# Job Stability Trends, Layoffs and Quits - An Empirical Analysis for West Germany

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**Abstract**

This paper studies signs and reasons of decline of job stability in West Germany. Using data from the longitudinal German Socio-Economic Panel 1984-1997 (about to be extended until 1999), we look at two measures for job stability. Based on repeated cross sectional data we first show that medium elapsed tenure declined for men. Secondly, we find that the measure of completed job duration can efficiently be used, to distinguish reasons for job termination and to surpass the problem of right censoring. Estimating the popular proportional Cox hazard model with competing risks, we show that the decline in stability of jobs of men beginning after 1984 can be attributed primarily to an increase in layoffs.
We will extend the analysis by taking unobserved heterogeneity into account, exploiting the presence of multiple spells in the data.. Furthermore, we will include jobs which started before 1985 into the multivariate analysis by using a stock sampling approach.

**Keywords: Job stability, labor mobility, layoffs, duration analysis**

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## 1 Introduction

In the recent past the question of job security and the stability of employment relationships has been increasingly discussed. The general notion is that job stability is on the decline in most OECD countries, although the actual empirical evidence is scarce and ambiguous. Several studies for Germany and other OECD countries like the United States and the United Kingdom show some limited evidence of increasing job instability (compare Bergemann and Schneider 1998; Burgess and Rees 1996, 1997, 1998; Swinnerton and Wial 1995; Diebold et al. 1997; Schmidt and Svorny 1998 and the articles in JOLE 17,4 part 2; OECD 1997; ILO 1996).

It is well known to economists that job stability is not necessarily always a good thing. Indeed if we believed that separations were always efficient (see e.g. McLaughlin 1991 or Parsons 1986) there would be nothing to worry about. However, most contracting mechanisms like a bonding scheme or a fixed wage contract such as in the early models by Oi (1962), Becker (1962) and Parsons (1972) or later models with costly or suppressed renegotiations of wages by Hashimoto (1981) and Hall and Lazear (1984) will yield separations that are not efficient. Moreover, too much job stability could be harmful at the macroeconomic level, if e.g. firms have difficulties restructuring their workforce in times of structural change. Indeed job relationships in Europe have often been termed too inflexible; just like labor market institutions per se, which is sometimes summarized in the term *Eurosclerosis*. Even at the individual level job stability is not always desirable as the existence of voluntary quits obviously reveal.

One major reason for some economists to be concerned about declines in job stability is the potential effect on individual career paths as too many job switches and interrupting unemployment spells may lead to losses in human capital, decreasing earnings potentials and limited capability to obtain work due to disadvantage signals (Spence 1973). Furthermore, economy wide long-term labor relationships might be one prerequisite for a highly educated workforce (Acemoglu and Pischke 1998), which is partly responsible for the economic success of a country. Therefore, careful interpretation of likely declines is important and especially the question of whether it is quits or layoffs causing it. Another important question is how to measure a

potential decline in job stability properly. We will try to give answers to these questions using data from the German Socioeconomic Panel (hereafter GSOEP).[1]

After surveying very briefly the literature on job stability we give a description of the data set GSOEP. We then proceed to a detailed analysis of elapsed firm tenure. Elapsed firm tenure of those currently in work is the most commonly used measure of job stability and has not been properly explored for Germany before. The GSOEP data show that there has indeed been a considerable decline in elapsed tenure in West Germany between 1984 and 1997. However, one serious problem of elapsed tenure is, that it does not take into account the problem of right censoring. We do not know how long jobs will actually last. This is especially a problem in times when many new hires are made. In this case average elapsed tenure will show a decline. To surpass the problem of right censoring we use competing risk hazard rate models in our major analysis of separation risks in Section 3. These models show that the decline in job stability can be attributed primarily to an increase in layoffs. Our final Section 4 summarizes the findings and give an outlook for future research.

[1] In a companion paper (Mertens and Bergemann 2000), we further analyze the question of whether different groups in the labor market are differently affected by a potential decline in job stability. Insiders who switch jobs could have different job stability patterns than outsiders who enter the labor market from unemployment or non-participation.

## 2 General Trends in Job Stability

### *2.1 The Literature*

The literature on job stability is primarily empirical,[2] though it certainly rests on the well-known theories describing mobility in the labor market. Human capital theory offers an explanation for why separations usually decline with labor market experience and tenure (see e.g. Becker 1962, Mincer 1962 and 1974, Oi 1962, Parsons 1972 and Hashimoto 1981). Search and matching theory also concludes that mobility decreases with tenure and experience, as good matches are the ones who survive the longest and older workers have simply had more time to locate well-payed jobs (see e.g. Stigler 1962, Mortensen 1970, Burdett 1978, Jovanovic 1979a, 1979b).[3] Therefore, it seems reasonable to use as a common measure of job stability the elapsed tenure of those currently employed, i.e. the time spent with a particular employer. If we find a general tendency of decreasing average tenure over time, this will be interpreted as an indication of declining job stability.

Most of the original US studies found little evidence for a drop in job stability between the 1970s and the early 1990s (see Farber 1995; Diebold et al. 1996, 1997).[4] Only Swinnerton and Wial (1995, 1996) reported declines in job stability although far lower in their reestimated results. Farber (1995) notes that men are increasingly less likely to be found at long term job relationships while women's probability of being at such increased significantly. Moreover, Farber concludes that groups with greater declines in earnings such as the young and especially the less educated experienced a greater decline in job stability. In more recent studies, some more evidence of declining job stability has been found. Newmark et al. (1999) report that job stability declined modestly in the first half of the 1990s. However, men with substantial tenure experienced a sharp decline in job stability during the first half of the 1990s. These results were confirmed by Jaeger and Stevens (1999) who show a declining fraction of workers with less than 10 years of tenure. However, Gottschalk and Moffitt (1999) do not find such evidence when estimating Cox Proportional

[2] One exception being Valetta (1999b), who offers an implicit contract model to explain inefficient separations. In this model declining job security for workers occurs if they are dismissed although they had reasonable expectations of not being dismissed.

[3] See Mertens (1998) for an overview of the theoretical and empirical literature on job mobility.

[4] For overviews of the literature in the U.S. see Schmidt and Svorny (1998) or Valetta (1999a). See also the special issue on the topic of the Journal of Labor Economics 17 (October 1999, part 2) where Gottschalk and Moffit present an interesting comparison of studies. Comparable studies for Europe only exist in the UK (see Burgess and Rees 1996, 1997, 1998).

Hazard Rate Models for different demographic groups. Separation rates do not increase and they observe that for white males the coefficients indicate a *decline* in the hazard for all education groups. These general results remain even if only those workers who report involuntary job terminations are looked at.

Finally, the literature on worker displacement shows that job loss increased since the 1970's, which increasingly affects more and more also high tenure and white collar workers (see Hamermesh 1989; Farber 1993, 1997; Hall 1995; Fallick 1996 and Kletzer 1998 for surveys). The facts reported by e.g. Farber (1997) cast some doubts on the notion that job stability did not change: job loss in the recession of 1981-1983 constituted about 13% of the workforce. The three-year rate of job loss decreased until the period 1987-89 and then rose to the highest level since 1981: 15% of the workforce lost their job in a period of expansion between 1993 and 1995. As Kletzer (1998) puts it, "These high rates of job loss are consistent with public perceptions of rising job insecurity".

The studies for Germany up to the present date have used differing measures, which come to apparently opposing results. Winkelmann and Zimmermann (1998) report decreasing numbers of job changes as evidence for an increase in job stability while Bergemann and Schneider (1998) use descriptive duration analysis to show that job stability declined. Prolonged times of unemployment and non-participation might bring the results into accord. Here we intend to give a detailed overview on the evolution of job duration, which starts, with the presentation of some statistics and graphs on elapsed tenure to get a grip on the information in the GSOEP data.

*2.2 The Data Set*

The GSOEP is a representative panel survey of households and their members, which has been collected for West Germany since 1984. The concept of the GSOEP is to annually re-interview the households and their split-offs usually in March.[5] In 1984, the sample consisted of approximately 4500 households and 9000 persons. The questionnaire of the GSOEP covers a wide variety of economic and social

[5] For further information about the GSOEP consult: German Institute for Economic Studies, DIW (1998).

characteristics of households and their members. In particular, the occupational situation of the interviewees is one of the main themes. Hardly any other German data set offers this variety of information, especially on the reasons why a job is terminated.

The information used to calculate the median of elapsed tenure is taken from the answers to the question on the time the employee has already spend with his/her current employer. However, the extraction of the spell data on job duration for the duration analysis is not as trivial as it seems to be. Workers report changes of the employment situation in the year before or during the year of the interview. With the help of this information we trace the job back to the point of time when it started. In the consecutive waves, we check whether and why jobs possibly ended. In this way, jobs, which cover the minimum of one interview date, can be detected. As the GSOEP offers the relevant information only since the beginning of 1985 only spells, which began in the time period between 1985 and 1995, could be taken into consideration. The observation period ends in December 1996. There exists a problem if more than one job change occurred between two interview dates. In this case, the exact termination date of the first job is not available. Therefore, these job spells must be handled as right censored, as are the jobs, which end without a reason and dropouts.

The analysis distinguishes three different destination states: Quits, which are initiated by the employee, layoffs, which are initiated by the firm, and a third category, here called ‘other reasons’ that include such reasons as the end of limited term contract and retirement. It also includes sabbatical leave and maternity leave if it is understood as termination of the job.

*2.3 The Empirical Analysis of Elapsed Tenure*

Table 1 shows the well-known fact that median elapsed tenure differs significantly by gender. While men's median tenure starts with 10.7 years in 1984 and ends with 9.3 years in 1997 women's median tenure is relatively constant at around 6.5 years. Now, it is important to distinguish different age groups because obviously older workers are able to accrue longer tenure than young workers. Age is therefore used as a (non-ideal) proxy for labor market experience. Median elapsed tenure is reported for the groups 16-25 years, 26-45 years and 46-65 years in Figure 1. The difference

between men and women is evident only in the older age groups. Younger female workers between 16 and 25 have tenure comparable to men. What is more striking, however, is that median elapsed tenure decreases for the young and middle aged men between 25 and 45 but increases substantially for male workers between 46 and 65. The female experience is strikingly different from the results reported by Farber (1995), Marcotte (1995) and Burgess and Rees (1998) for the United States and the UK. It seems that while women in the US and the UK were able to accrue longer tenure over time, German women were only able to hold the level already acquired in the mid-1980s.

Another interesting detail of the tenure pattern has been pointed out by Gregg and Wadsworth (1995). They show for the UK that median elapsed tenure for part-timers and full-timers differs significantly. Moreover, part-timers face increasing separation probabilities over time. Therefore, Figure 2 shows median elapsed tenure by regular hours worked. Men in part-time jobs and marginal employment[6] obviously have lower median elapsed tenure than full-time workers, however only around 3% of male workers can be found in these two categories (own calculations from the GSOEP, see also Hoffmann and Walwei 1998). Median tenure calculated for other than full-time male workers is very erratic and the observed decline in median tenure therefore seems to be due to decreasing median tenure in full-time employment.[7] As would have been expected women are more frequently found in part-time work (around 30%). It is interesting to see that this type of work is even associated with slightly higher median tenure than full-time work and there are no clear tendencies over time for the three employment types.

Similarly, tenure by industry differs more strongly for men than for women as can be seen from Figure 3 where the most important sectors are depicted. In trade, services and manufacturing median tenure decreased by 1 to 2 years between 1984 and 1997. In the state sector median tenure even increased. This is probably due to reduced hiring by the state.

[6] There are strict definitions for marginal employment in Germany. Working either below 15 hours or receiving monthly wages of only 620 DM (margin since 1998).
[7] In 1988 around 3000 male workers are observed in full-time employment and only around 60 in part-time or marginal employment.

Knowing that there has been a considerable decline in the median elapsed tenure for men we still do not know what the potential reasons are and therefore we have no hint of whether this is a positive or worrisome finding. Considering the business cycle we know that (voluntary) quits are pro-cyclical, while (involuntary) layoffs are counter-cyclical both influencing the tenure distribution. In boom periods more new jobs are created which leads automatically to more jobs with short duration. Hence, tenure decreases usually even if layoffs are reduced. In recessions there will be more layoffs, less quits, and average tenure is likely to increase as new hires are rare (Burgess and Rees 1996, Schettkatt 1996). Between 1984 and 1989 the West German economy recovered from a recession in the early 80s leading to falling unemployment rates and slightly better job prospects for workers as can be seen from Figure 4. In 1990, the year of re-unification, however, there has been a pronounced boom bringing capacities in West Germany to their limits. This was primarily due to increasing demand for West German products in East Germany. This boom ended dramatically in 1993 followed by a recession from which the West German economy has recovered very slowly since then. Unemployment in West Germany has increased and growth rates are at relatively low levels. Concerning the evolution of elapsed tenure, there are indeed some business cycle influences, which however cannot account fully for the observed pattern. In Figure 1 we see that in the recession of 1993-94 median tenure was higher than in the following years. But comparing 1984 with 1994, two years with relatively similar growth rates of GDP we see that median tenure for the age group 26-45 has dropped from 9 to 7.5 years.

A related and alternative explanation for the decline of job tenure is the increasing number of employees in West Germany, as increasing numbers of new hires lead to a decline in elapsed tenure. If new hires were the reason for decreasing job stability there wouldn't be anything to worry about, but the number of dependent employees has been on the decrease since 1993 as can be seen from Figure 4.

If we rule out these two possibilities, the effects of the "usual suspects" could finally come into question: structural change, "globalization" and technological progress leading to both increased layoffs and quits as new job opportunities arise. The result would again be reduced average tenure in the economy. Astonishingly little is known on these interdependencies, while the effects on wage differentials have been of

some concern in recent years.[8] Moreover, there are only a few studies up to the present moment by Booth et al. (1999) and Valetta (1999b), which focus on the reasons for increasing job instability. Booth et al. (1999) show that over a time span of around forty years the likelihood of one leaving his or her job in the UK has increased, with layoffs going up more than quits. This clearly illustrates the increased job instability in the 1980s. Valetta (1999b) shows that in the US male workers with substantial job tenure experienced a rising incidence of permanent layoffs between 1976 and 1992. Keeping this in mind we now go on to explore the development of job duration and the reasons for separation in Germany in more detail.

## 3. Do New Jobs Tend to End Early?

A good way to look at the development of job duration is to refer to duration analysis. This type of analysis has several advantages: the model uses information on when jobs end exactly and it controls for right censoring of employment spells. Furthermore, looking at elapsed tenure (or even retention rate estimates) we only take into account whether jobs end (usually) within a year. The GSOEP, however, includes monthly information on job duration that should be exploited. Moreover, duration analysis allows the analysis of jobs in a multivariate setting by combining all observations in one single estimation, adding to the clarity of results. Usually, separate models for workers with different elapsed tenure are estimated instead.[9] Thus, our study is more in the tradition of the work by Booth et al. (1999) and Gottschalk and Moffitt (1999), who estimate hazard rate models as well.

Still, it is important to note that the shift in the type of analysis also includes a shift in the perspective. First of all, we will only analyze the evolution of jobs that started after a certain date, in our case January 1985. This is not a problem here, as we are not so much interested in very long-lasting jobs for older workers. As shown in Figure 1 older workers experienced increases in median elapsed tenure in contrast to the overall downward trend. The likely reason could be separation rules, especially during that time period. Early retirement programs coupled with strict separation rules resulted in less hiring of older people, greatly influenced tenure at the upper end of the distribution.

[8] See e.g. Katz and Murphy 1992; Levy and Murnane 1992; Krugman 1994; Leamer 1994 and 1996; Freeman and Katz 1995.
[9] For Logit regressions on the probability to be in short or long jobs see Mertens 1999.

Second, we sample jobs rather than people. As most people tend to be in long jobs, but most jobs are short lived, average duration of a job spell is rather short, compared to elapsed firm tenure (Topel and Ward 1992, Farber 1999). Indeed, we believe that testing the influence of those very short jobs is important when looking at the question of changing job stability as also done by Gottschalk and Moffitt (1999) and Mertens (1999). There might be sub-groups of workers who are especially harmed by the decrease in job duration by having to switch jobs frequently. The latter problem is the central question of our companion paper (Mertens and Bergemann 2000). Our focus here is on the reasons for separations.

*3.1 Empirical Modeling*

The basic tools to model duration data are survival functions $\overline{F}(x)$ and hazard functions $h(t)$ at some duration $t$. Duration $t$ is commonly defined as a measure of length of a spell between certain events.

$\overline{F}(t)$ gives the probability that a duration will last longer than $t$. Formally for continuous time:

(1) $$\overline{F}(t) = P[T \geq t] = 1 - F(t) = 1 - \int_0^t f(s)ds$$

with $F(t)$ denoting the distribution function.

The hazard function $h(t)$ gives the rate per time period at time $t$ that the probability of a spell terminating is amassed conditional on the spell not being terminated prior to $t$. For continuous duration the hazard function $h(t)$ is defined by

(2) $$h(t) = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{\overline{F}(t)}$$

with $f(t)$ denoting the density function for some duration t.

It should be noted, that the hazard and survival function are closely related (as well as with the density and the distribution function). One can be derived by the other using the following relationship.

(3) $$\overline{F}(t) = \exp\left( - \int_0^t h(s)ds \right)$$

However, individuals might face different risks of terminating a spell according to their environmental and individual characteristics. Furthermore, the risk might change over the duration of a spell: an observation, which is commonly subsumed under the heading 'duration dependence'. Consequently, the hazard function should be modeled such that it not only depends on time but also on covariates i.e.:

$$h(t) = \theta(t; x) \tag{4}$$

We choose the popular Semi-Parametric Proportional Cox Model as a basis for our estimation. The effects of covariates on the hazard rate are restricted in this model to be proportional.

$$\theta(t; x) = \theta_0(t) \exp(x'\beta) \tag{5}$$

The major advantage of this model is that it leaves the form of the so called 'baseline hazard' $\theta_0(t)$ unspecified. Thus, no special assumption concerning the duration dependence is necessary.

We extend this standard Cox Model in two ways in order to accommodate our question properly: First, it is specified in a competing risk form to distinguish between the determinants that are responsible for the different reasons of job termination. Consequently, when the hazard of dismissal is estimated, spells ending with termination due to quit or due to other reasons are recorded as censored, and vice versa. Also spells that end without an indicated reason are treated in this model as censored.

Furthermore, it is intended to appropriately take into account the changing economic conditions as well as changing individual determinants over the length of a spell. Therefore, the model allows for time varying covariates on annual basis. The exit specific hazard rate of the Semi-Parametric Proportional Cox Model takes the form:

(6) $$\theta_e(t;x) = \theta_{e0}(t)\exp(x'\beta_e)$$

where $\theta_{e0}(t)$ is the 'baseline' hazard for the respective termination state (e) and $x(t)$ stands for the time-varying covariates. These hazard rates are estimated, separately for each gender, as the employment behavior of men and women show clear differences.

*3.2 Multivariate Estimation Results*

Let us first have a look whether the risk that a job spell ends has increased in recent years. To receive results that are comparable to the analysis of elapsed tenure, we first ignore the reason for separation. We regress job duration on a time trend, whereby the time trend is modeled as a time varying variable which takes the value 1 when the job was held in 1985, 2 when held in 1986 and so forth.[10] The results are documented in Table 2.[11] The data confirm the statements of the preceding analysis on elapsed tenure. We find a clear-cut tendency for a decline in job duration for men over time and a less obvious result for women. The coefficient on the time trend of job duration for women is only significant on the 10% level, but the sign on the coefficient points in the same direction as the one for men.

Still, nothing is said so far on the reasons for the decline of job duration. However, with the analysis of spell data, we are now able to assess this question in a more differentiated analysis distinguishing jobs by their reasons of termination. As a first step, job duration until dismissal, quit or termination due to other reasons is again purely regressed on the time trend. Table 3 presents the estimation results. As the coefficients show, job duration of men until layoff decreased significantly over time. For women, no tendency over time can be observed. There are indications that job duration until quitting of men has slightly increased. Job duration of men and women ending out of other reasons decreased significantly over time.

Further determinants, which are known to potentially influence job duration (compare e.g. Mertens 1998), are included in the econometric model to control for their influences on job duration. Three different types of covariates can be

[10] It might seem to be a very restricted modelling of a time trend. However regression on a set of time dummies shows, that the assumption of linearity is justified.

[11] The coefficients have to be interpreted in the following way. A positive coefficient points out that an increasing value of the covariate leads to an increasing hazard of ending a job.

distinguished. Firstly, the growth rate of the real GDP is incorporated to capture the changes in the economic conditions of West Germany.[12] Secondly, individual characteristics, which are known to influence job duration such as age and kind of professional education are included. Furthermore, job specific variables are considered, which comprise job status, part time status and industry affiliation.[13]
Table 4 presents the estimation of the hazards of job termination for this model. Let us first consider the influence of the economic conditions on job duration. As expected, the state of the economy has a significant impact on job duration. In an economic slowdown, the risk of being given notice increases, whereas in an economic upturn, the odds to resign increase. Unlike men women face an increasing hazard of leaving due to other reasons in times of a positive economic development. These results prove again the importance to distinguish between business cycle influences and secular trends in job duration.[14] A fact, which for example, Gottschalk and Moffitt (1999) did not consider. They include similar to our study a linear trend term for the year of observation in the analysis, but did not include measures of labor market tightness.

The issue of particular interest is the evolution of layoffs and quits over time. Therefore, let us turn to the coefficient on the time trend. First, the results for men are reported. There is still a clear tendency towards an increase in the hazard of being laid-off in this model. The coefficient is positive and significant. The hazard of quitting, on the other hand, is not influenced by the time. There is still an increasing trend in the hazard of leaving a job due to other reasons. The hazard of being laid off for women shows no significant tendency. The quits of women depict also no significant change. However, like men, women face an increasing hazard of leaving the job due to other reasons.

This decrease of the job duration of men and women until termination due to other reasons might be on the one hand side the result of the extended early retirement programs and so called ‘social plans’. With the aid of the social plans to reduce the workforce, it was a relatively frequent practice to dissolve the working contract of older workers while paying the difference between unemployment benefits up to the

[12] Data is taken from the Federal Statistic Office Germany .
[13] Due to data problems firm size could not yet been considered.
[14] However, the significance of the coefficient on the growth rate in the model of layoffs of men on the 10% level might indicate that the relationship is not as simple as it is modelled here.

year of early retirement (Börsch-Supan and Schnabel 1997). This can be interpreted as a kind of discharge in early retirement, which often occurred in mutual agreement. And additionally for women the change in the regulation of maternity leave might play a certain role. From 1985 onwards, the protected maternity leave increased in steps from 6 months to three years in 1992 (Ondrich et. al., 1998). This longer period of absence gives an incentive to leave the job with the protection of maternity leave instead of, for example, resigning.

The results concerning the influence of age on job duration can be summarized as follows: Young men at the age of 25 to 34 years are less likely to be laid off. Voluntary quitting is, however, more likely the younger the workers are and the probability to leave the job due to other reason decreases first with age but increases again in the age of 55 and older.

This fact as well as the argumentation on the early retirement programs and maternity leave suggests a special influence of age on job duration. Therefore, we interact the time trend with the age dummies. As Table 5 shows, especially young and middle aged men are subject to the increase of the risk of being laid-offs. With respect to the hazard of job termination due to other reasons it has to be noted that being 45 to 54 years old increases slightly the trend towards shorter jobs. This might give some evidence for the conjecture that the increase in the odds to leave due to other reasons might be – at least partly - another form of an increase of the odds of being laid off. Furthermore, the negative significant coefficients on the interaction terms support the suggestion that the change of maternity leave legislation influenced the coefficient on termination due to other reasons. However, there is still a common trend towards shorter jobs due to other reason left, which cannot be explained with the arguments at hand.

Further results on the determinants of job duration can be summarized as follows. The job status plays a crucial role in determining job duration. Being a skilled blue or white collar worker results in a prolonged job for men, whereas there is practically no influence of vocational education on the risk to end a job. Surprisingly, being a part-timer significantly decreases the odds of being laid off and increases the odds of quitting for men. Finally the results concerning industry affiliation should be reported. As expected, industry affiliation influences job duration, too. The dummies

are in all specifications except for women quitting and leaving due to other reasons jointly significant. The direction of the effects is also less surprising. For example, working in the construction industry increases the hazard of being laid off, whereas working in public administration reduces the risk.

## 4 Conclusion

Our results support the view that job stability in Western Germany has declined since the mid-1980s. However, not all demographic groups in the labor market are equally affected. Using repeated cross sections from the German Socioeconomic Panel (GSOEP) we show that male workers have experienced a decrease in median elapsed tenure from 10.7 years to 9.3 years between 1984 and 1997. While women in other countries like the U.S. or the UK were able to accrue higher median tenure on average, there has not been such an increase in Germany between 1984 and 1997.

These simple cross sectional results are confirmed in our multivariate analysis where we control for the business cycle as well as demographic and job characteristics. Estimating a Cox Model we show that the risk of job termination for men has increased over the observation period. Extending our analysis to a competing risks form we are able to show that this increase was caused primarily by an increase of layoffs and terminations due to other reasons, while the hazard of quits does not change significantly. Women on the other hand face an increasing hazard of leaving a job due to other reasons only. We argue that this increase in the risk to leave a job due to other reasons is partly due to extended early retirement-programs and changes in the maternity leave legislation. Workforce reductions via discharge in early retirement were relatively common during that period. Moreover, the increase in possible maternity leave from 6 months to three years reduced the number of women quitting their jobs after childbearing.

In a next step we will extend our analysis until the end of 1999, the maximum available observation period. We will also add a stock sampling analysis such that job which started before 1985 can be included into the duration analysis. Furthermore, we will conduct additional sensitivity checks by taking into account unobserved heterogeneity exploiting the presence of multiple spells in the data..

Considering the results so far it is certainly exaggerated to talk about a serious deterioration in job stability, as we are not sure whether this is a long term trend.

Still, there is room for concern. Increasing layoffs go hand in hand with obvious negative consequences for the individual if no alternative job is found immediately, which cannot be assumed to be the case with unemployment rates at around 10%. Though wage losses upon re-employment are not as large as in the United States for the majority of workers, prolonged unemployment may lead to severe income losses (compare Burda and Mertens 2000). Moreover, it could be the case that increasing layoff risks affect 'outsiders' more seriously leading to a stronger dualization of the labor market. In our companion paper (Mertens and Bergemann 2000) we show that there is some evidence for this hypothesis. Finally, with men being increasingly exposed to layoffs, the willingness to accrue education and specific capital may be limited. On the other hand it could be argued that the decrease in job stability simply shows that the German economy is adjusting to the globalization and technological innovation process. That the economy is even becoming more flexible with positive side effects on the macroeconomic development however is to be questioned in view of persistently high unemployment rates. Further studies which shed light on the background of this development are clearly needed.

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# Appendix

## Tables

**Table 1 -** Median Tenure in Years

| | Men | | Women | |
|---|---|---|---|---|
| | Median tenure | Observations | Median tenure | Observations |
| 1984 | 10.7 | 2522 | 6.3 | 1598 |
| 1985 | 10.5 | 2620 | 5.8 | 1701 |
| 1986 | 10.3 | 2473 | 6.3 | 1605 |
| 1987 | 10.4 | 2426 | 6.7 | 1568 |
| 1988 | 10.5 | 2303 | 6.6 | 1552 |
| 1989 | 10.1 | 2243 | 6.6 | 1538 |
| 1990 | 9.7 | 2216 | 6.2 | 1563 |
| 1991 | 9.7 | 2223 | 6.5 | 1576 |
| 1992 | 9.7 | 2157 | 6.5 | 1544 |
| 1993 | 9.6 | 2133 | 6.5 | 1552 |
| 1994 | 9.6 | 2059 | 6.8 | 1509 |
| 1995 | 9.5 | 2015 | 6.6 | 1459 |
| 1996 | 9.1 | 2007 | 7.0 | 1481 |
| 1997 | 9.3 | 1970 | 6.0 | 1475 |

*Note:* All observations are weighted by the GSOEP sample weight.
*Source:* Own calculations based on the GSOEP 1984-1997. Only German citizens living in West Germany (Sample A), full-time and part-time workers, without observations with missing values on age, sex and tenure.

**Table 2** – Estimation Results of the Hazard of Job Termination [a]

| | Men | Women |
|---|---|---|
| Time Trend | **.039**** | **.025**$^{+}$ |
| | (.015) | (.014) |
| Log Likelihood | -4102.1 | -4722.5 |
| (LR Chi²) | (7.29) | (3.29) |
| No of Observations | 1166 | 1212 |
| No of Destination States | 635 | 733 |

[a] Robust standard errors in brackets and one* indicates significance at the 5% significance level, ** at the 1% significance level and $^{+}$ at the 10% significance level.
Source: Own calculation using the GSOEP. Only German citizens living in West Germany (Sample A) full-time and part-time employees, without missing values on age, sex, education, job status and industry affiliation.

**Table 3 –** Estimation Results of the Competing Risk Model of the Hazard of Job Termination[a]

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Job Ended by: | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Time Trend | **.143**** | **-.038**$^{+}$ | **.075*** | **.058** | **-.028** | **.068*** |
| | (.033) | (.022) | (.038) | (.037) | (.022) | .(027) |
| Log Likelihood | -963.1 | 1867.6 | -606.9 | -793.5 | -1745.1 | -1112.2 |
| (LR Chi²) | (19.07) | (3.13) | (3.89) | (2.47) | (1.55) | (6.41) |
| No of Observations | 1166 | 1166 | 1166 | 1212 | 1212 | 1212 |
| No of Destination States | 151 | 291 | 94 | 125 | 270 | 173 |

[a] Robust standard errors in brackets and one* indicates significance at the 5% significance level, ** at the 1% significance level and $^{+}$ at the 10% significance level.
Source: Own calculation using the GSOEP. Only German citizens living in West Germany (Sample A) full-time and part-time employees, without missing values on age, sex, education, job status and industry affiliation.

**Table 4**: Estimation Results of the Competing Risk Model of the Hazard of Job Termination – Reference Model[a]

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Job Ended by: | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Time Trend | **.127**** (.037) | **-.014** (.025) | **.093*** (.047) | **.019** (.041) | **.016** (.026) | **.136**** (.037) |
| Growth Rate of Real GDP | **-.077**$^{+}$ (.042) | **.089**** (.031) | **.056** (.056) | **-.149**** (.041) | **.084**** (.033) | **.143**** (.050) |
| Age:<br>Base Category*: 18-24 years* | | | | | | |
| *25-34 years* | **.-515*** (.249) | **-.084** (.170) | **-.885**** (.278) | **.040** (.248) | **-.168** (.158) | **.342**$^{+}$ (.211) |
| *35-44 years* | **-.201** (.264) | **-.383**$^{+}$ (.200) | **-1.048**** (.347) | **-.079** .266 | **-.333**$^{+}$ (.183) | **-.536*** (.270) |
| *45-54 years* | **.207** (.295) | **-1.025**** (.322) | **-2.311**** (.741) | **-.084** (.336) | **-1.155**** (.209) | **-.838*** (.364) |
| *55 years and older* | **.184** (.423) | **-1.148*** (.495) | **.258** (.375) | **.122** (.546) | **-1.709*** (.685) | **-.019** (.430) |
| Vocational Education:<br>Base Category:<br>*No Vocational Education* | | | | | | |
| *Vocational Training* | **-.088** (.244) | **.306** (.203) | **.148** (.318) | **.062** (.251) | **.077** (.178) | **.095** (.209) |
| *College Degree* | **-.377** (.390) | **.435**$^{+}$ (.257) | **.286** (.441) | **-.129** (.488) | **.033** (.305) | **.670*** (.305) |
| Part-time Status: | **-1.817**$^{+}$ (.992) | **.656*** (.293) | **.312** (.542) | **-.401**$^{+}$ (.212) | **.145** (.141) | **.055** (.175) |
| Job Status:<br>Base Category*:*<br>*Less Skilled Blue Collar* | | | | | | |
| *Skilled Blue Collar* | **-.397**$^{+}$ (.225) | **-.220** (.179) | **-.488**$^{+}$ (.275) | **.012** (.411) | **.083** (.291) | **-.439** (.404) |
| *Less Skilled White Collar* | **.228** (.396) | **.274** (.277) | **-.620** (.588) | **-.112** (.306) | **.379**$^{+}$ (.221) | **.301** (.278) |
| *Skilled White Collar* | **-.621**** (.242) | **-.382**$^{*}$ (.188) | **-.890**** (.338) | **-.457**$^{+}$ (.266) | **-.054** (.194) | **-.342** (.234) |

Table 4 continued….

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Job Ended by: | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Industry Affiliation<br>Base Category*: Manufacturing* | | | | | | |
| *Utility* | **-1.000**<br>(1.042) | **-1.879**$^{+}$<br>(1.023) | **.537**<br>(.530) | | **.715**<br>(.618) | **.948**<br>(.667) |
| *Construction* | **.687****<br>(.221) | **.039**<br>(.189) | **.153**<br>(.323) | **.795**$^{+}$<br>(.441) | **-.417**<br>(.494) | **.114**<br>(.436) |
| *Distribution* | **.464**$^{+}$<br>(.272) | **.401***<br>(.203) | **.117**<br>(.385) | **.492**$^{+}$<br>(.253) | **.188**<br>(.193) | **-.074**<br>(.249) |
| *Transportation* | **.213**<br>(.309) | **-.193**<br>(.258) | **-.829**<br>(.580) | **-.349**<br>(.753) | **-.111**<br>(.464) | **-.376**<br>(.605) |
| *Banking* | | **.060**<br>(.305) | **-.067**<br>(.764) | **-.689**<br>(.613) | **-.230**<br>(.342) | **-1.048**$^{+}$<br>(.590) |
| *Services* | **.344**<br>(.272) | **.409***<br>(.180) | **.817****<br>(.297) | **-.045**<br>(.267) | **.152**<br>(.182) | **.109**<br>(.216) |
| *Public Administration* | **-1.909**$^{+}$<br>(1.034) | **-.471**<br>(.369) | **1.011***<br>(.402) | **-2.265***<br>(1.009) | **-.155**<br>(.280) | **-.029**<br>(.315) |
| Log Likelihood<br>(LR Chi²) | -931.9<br>(84.11) | -1836.5<br>(59.95) | -580.4<br>(82.55) | -770.2<br>(39.08) | -1723.2<br>(41.41) | -1080.8<br>(64.06) |
| No of Observations | 1166 | 1166 | 1166 | 1212 | 1212 | 1212 |
| No of Destination States | 151 | 291 | 94 | 125 | 270 | 173 |

[a] Robust standard errors in brackets and one* indicates significance at the 5% significance level, ** at the 1% significance level and $^{+}$ at the 10% significance level.
Source: Own calculation using the GSOEP. Only German citizens living in West Germany (Sample A) full-time and part-time employees, without missing values on age, sex, education, job status and industry affiliation

**Table 5:** Estimation Results of the Competing Risk Model of the Hazard of Job Termination – Extended Model[a]

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Job Ended by: | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Time Trend | **.281**** (.081) | **-.071** (.573) | **.132*** (.064) | **-.029** (.613) | **-.045** (.041) | **.255**** (.059) |
| Growth Rate of Real GDP | **-.074**$^{+}$ (.042) | **.091**** (.032) | **.057** (.056) | **-.152**** (.041) | **.093**** (.033) | **.137**** (.050) |
| Age:<br>Base Category*: 18-24 years* | | | | | | |
| *25-34 years* | **1.349** (.967) | **-.652** (.500) | **-.160** (-.838) | **-.689** (.834) | **-.924*** (.448) | **1.540*** (.652) |
| *35-44 years* | **1.317** (1.030) | **-.819** (.592) | **-.361** (1.045) | **-1.478** (1.001) | **-.869**$^{+}$ (.513) | **.876** (.815) |
| *45-54 years* | **1.467** (1.284) | **-1.050** (1.015) | **-13.971*** (7.118) | **.648** (.961) | **-2.714**** (1.042) | **1.133** (1.778) |
| *55 years and older* | **3.411*** (1.378) | **-2.466** (1.721) | **-.125** (1.373) | **2.760** (1.934) | **-9.336**** (1.176) | **4.079**$^{+}$ (2.220) |
| Time Trend *Age:<br>Base Category:<br>*Time Trend* 18-24 years* | | | | | | |
| *Time Trend* 25-34 years* | **-.198*** (.095) | **.074** (.063) | **-.082** (.090) | **.083** (.089) | **.093**$^{+}$ (.052) | **-.137*** (.066) |
| *Time Trend*35-44 years* | **-.162**$^{+}$ (.100) | **.059** (.071) | **-.075** (.109) | **.150** (.102) | **.069** (.059) | **-.158**$^{+}$ (.083) |
| *Time Trend*45-54 years* | **-.136** (.124) | **.011** (.118) | **.990**$^{+}$ (.579) | **-.075** (.106) | **.180**$^{+}$ (.108) | **-.222** (.198) |
| *Time Trend*55 years and older* | **-.348*** (.148) | **.155** (.178) | **.033** (.134) | **-.256** (.207) | **.706**** (.104) | **-.436**$^{+}$ (.239) |
| Vocational Education:<br>Base Category:<br>*No Vocational Education* | | | | | | |
| *Vocational Training* | **-.106** (.245) | **.317** (.204) | **.129** (.323) | **.064** (.252) | **.085** (.179) | **-.123** (.210) |
| *College Degree* | **-.409** (.384) | **.454**$^{+}$ (.259) | **.259** (.445) | **-.144** (.496) | **.075** (.307) | **.688*** (.301) |
| Part Time Status: | **-1.863**$^{+}$ (.981) | **.672*** (.295) | **.301** (.544) | **-.398**$^{+}$ (.213) | **.155** (.142) | **.061** (.177) |
| Job Status:<br>Base Category*:<br>*Less Skilled Blue Collar* | | | | | | |
| *Skilled Blue Collar* | **-.374**$^{+}$ (.224) | **-.228** (.180) | **-.470**$^{+}$ (.280) | **.013** (.413) | **.079** (.389) | **-.423** (.407) |
| *Less Skilled White Collar* | **.212** (.398) | **.268** (.277) | **-.602** (.592) | **-.166** (.307) | **.382**$^{+}$ (.224) | **.321** (.279) |
| *Skilled White Collar* | **-.587*** (.246) | **.395*** (.189) | **-.870*** (.345) | **-.469**$^{+}$ (.264) | **-.046** (.193) | **-.304** (.234) |

Table 5 continued…

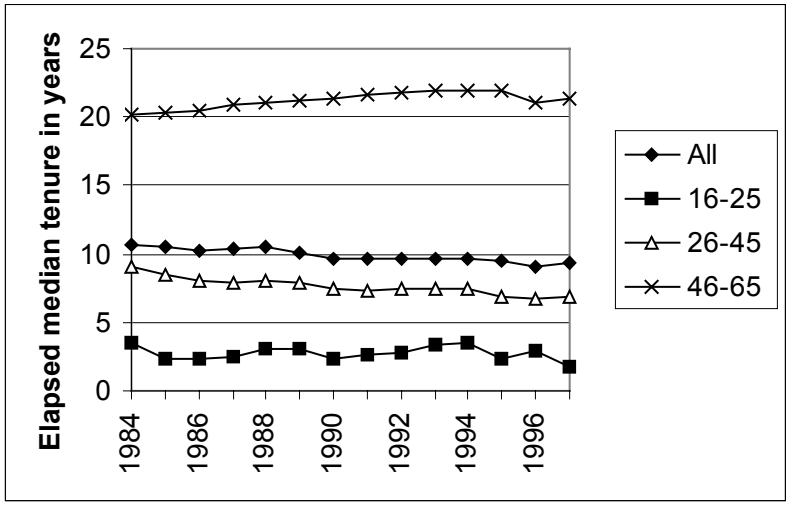
| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Job Ended by: | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Industry affiliation<br>Base Category*: Manufacturing* | | | | | | |
| *Utility* | **-.922**<br>(1.046) | **-1.905**$^{+}$<br>(1.025) | **.580**<br>(.540) | | | |
| Construction | **.694****<br>(.221) | **.038**<br>(.190) | **.160**<br>(.323) | **.826**$^{+}$<br>(.440) | **-.448**<br>(.490) | **.047**<br>(.436) |
| *Distribution* | **.459**$^{+}$<br>(.272) | **.404***<br>(.204) | **.103**<br>(.386) | **.492**$^{+}$<br>(.255) | **.159**<br>(.191) | **-.131**<br>(.246) |
| *Transportation* | **.190**<br>(.309) | **-.190**<br>(.258) | **-.814**<br>(.590) | **-.357**<br>(.764) | **-.159**<br>(.460) | **-.449**<br>(.625) |
| *Banking* | | **.048**<br>(.305) | **-.066**<br>(.766) | **-.645**<br>(.611) | **-.274**<br>(.339) | **-1.078**$^{+}$<br>(.590) |
| *Services* | **.361**<br>(.272) | **.406***<br>(.181) | **.820****<br>(.296) | **.031**<br>(.269) | **.117**<br>(.180) | **.051**<br>(.210) |
| *Public Administration8* | **-1.901**$^{+}$<br>(1.034) | **-.476**<br>(.369) | **.980***<br>(.415) | **-2.268***<br>(1.006) | **-.202**<br>(.280) | **-.067**<br>(.313) |
| Log Likelihood<br>(LR Chi²) | -928.1<br>97.48 | -1835.5<br>62.21 | -578.1<br>93.63 | -767.1<br>47.62 | -1720.6<br>96.55 | -1077.9<br>71.97 |
| No of Observations | 1166 | 1166 | 1166 | 1212 | 1212 | 1212 |
| No of Destination States | 151 | 291 | 94 | 125 | 270 | 173 |

[a] Robust standard errors in brackets and one* indicates significance at the 5% significance level, ** at the 1% significance level and $^{+}$ at the 10% significance level.
Source: Own calculation using the GSOEP. Only German citizens living in West Germany (Sample A) full-time and part-time employees, without missing values on age, sex, education, job status and industry affiliation

## Figures

**Figure 1** - The Evolution of Median Elapsed Tenure by Age Groups

Panel A - Men




Panel B - Women

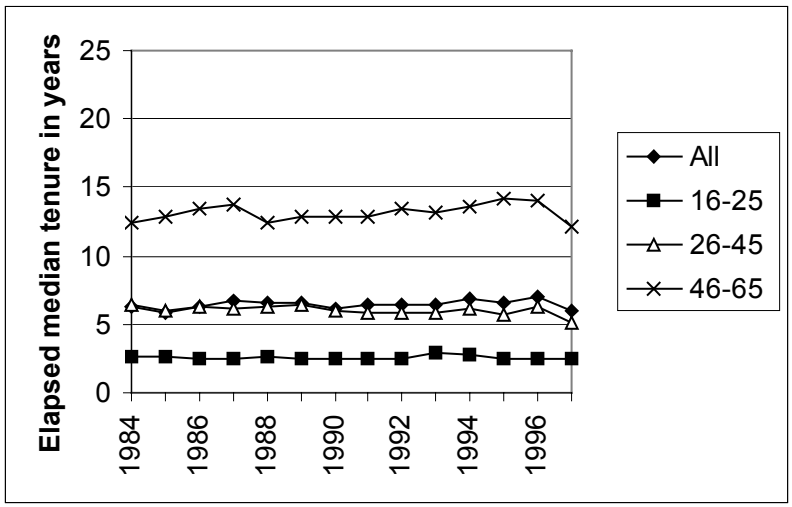
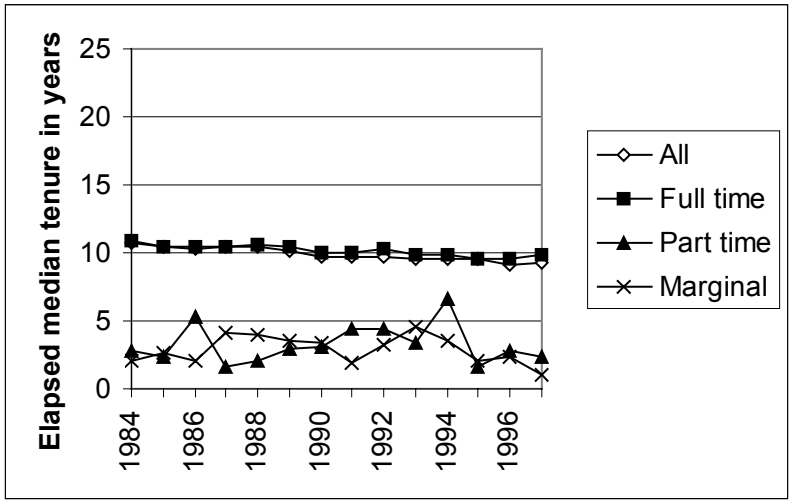
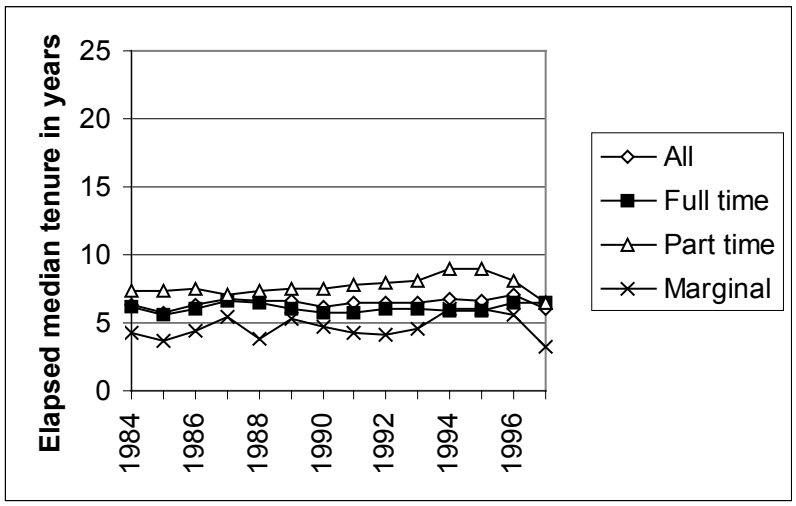


**Figure 2** - The Evolution of Median Elapsed Tenure by Hours Worked

Panel A - Men



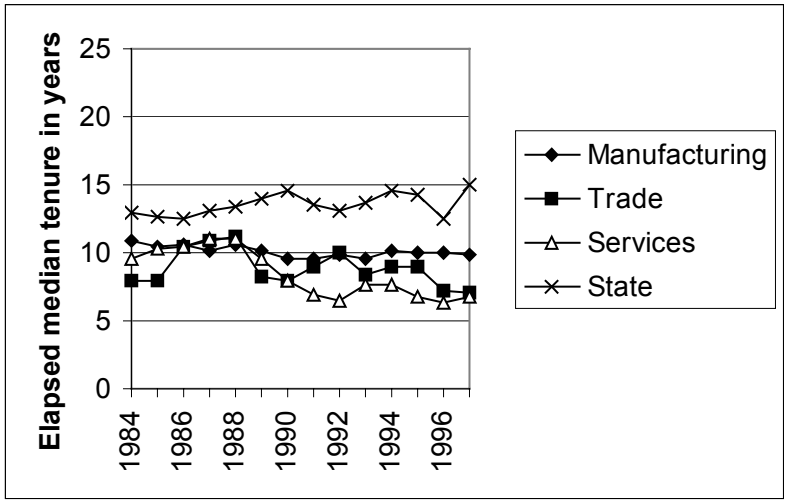

Panle B - Women



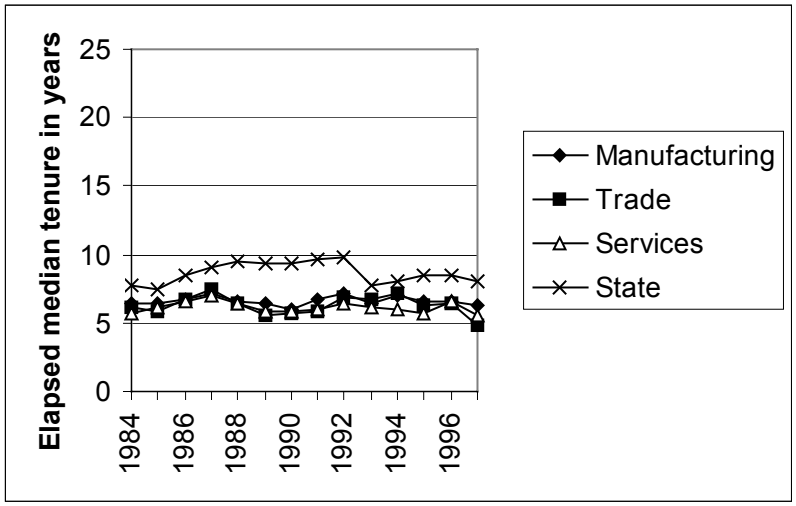

*Source:* Own calculations based on the GSOEP (sample A).

**Figure 3** - The Evolution of Median Elapsed Tenure by Industry

Panel A - Men

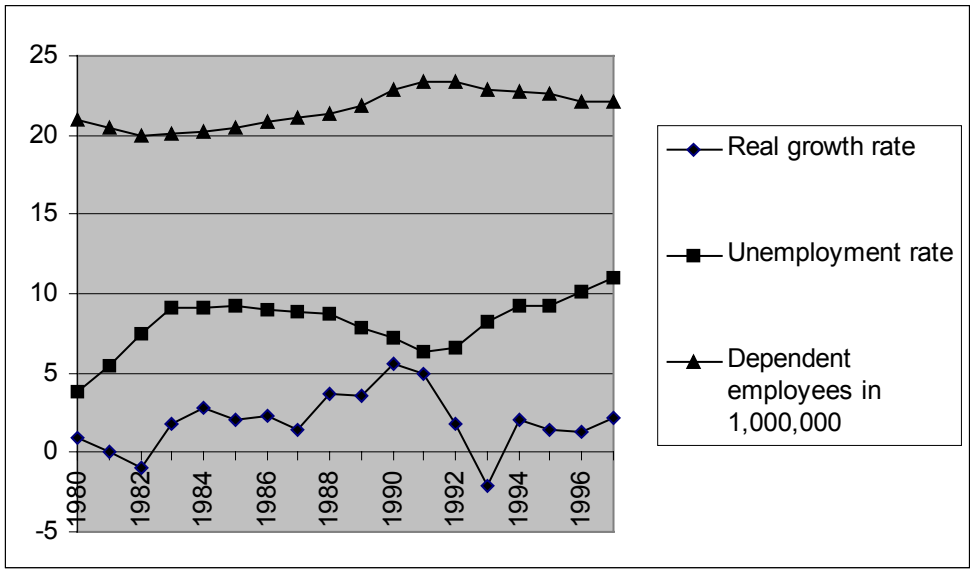



Panel B - Women




*Source:* Own calculations based on the GSOEP (sample A).

**Figure 4** - Unemployment and the Business Cycle in West Germany




*Source:* Statistisches Jahrbuch für die Bundesrepublik Deutschland and Amtliche Nachrichten der Bundesanstalt für Arbeit.